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and significance of language. In this part of the work we must find the chief interest in the fact that we have an attempt to theorize as to the origin of speech from the standpoint of its beginning in the lower animals, rather than from the standpoint of its more developed conditions in man. The study of language hitherto has been to reduce human language to its lowest and simplest form. Mr. Garner for the first time attempts to develop language from its simpler conditions in the lower animals, and if Mr. Garner's conclusions differ in some respects from the ideas that have hitherto been in vogue, it is not surprising.

On the whole, the work of Mr. Garner is extremely interesting and suggestive. As a piece of book-making it is open to criticism. It is sketchy; it is not very logically arranged, containing a miscellaneous mixture of observations on the intelligence, habits, gestures, affections, and general mental attributes of monkeys, some of which are new, but most of which are not especially new, and have little relation to the subject of monkey speech. The observations on the actual speech of monkeys, which is of course the really valuable part of the work, fills only a small portion of the book. We must look upon this volume and the work it describes simply as an outline sketch of the beginning of a series of results which may be carried to a successful issue in later years. The thanks of science are certainly due to Mr. Garner for opening to us a new line of research and a new realm of suggestive thought.

H. W. CONN.

Outlines of Zoölogy. By J. ARTHUR THOMSON. Edinburgh and London, Young J. Pentland, 1892. 655 p. Ill.

FOR some years now there has been no text-book of zoölogy in the English language at all adequately representing the present state of the science, and at the same time of moderate cost. The cost of Claus and Sedgwick is high; the translation of Lang must remain incomplete till the original shall be finished; Lankester's promised book still delays its appearance; Packard is out of date, as for that matter is Claus and Sedgwick; and the college teacher

who wishes his students to have a good reference book in their possession hardly knows where to turn when the said students combine a comparative ignorance of German with thinly-lined pocket-books. Under these circumstances, the prospect afforded by the announcement of Mr. Thomson's book was distinctly attractive.

It may be said at the outset that the book to a large extent responds to favorable anticipations. Mr. Thomson, while not much known as an original investigator, has made a record for himself in the hardly, if at all, less useful rôle of abstractor and collator of the work of others, while his occasional essays and his work with Professor Geddes on the evolution of sex have shown him to possess an agreeable literary style. The "Outlines of Zoölogy" is an exceedingly readable book, and perhaps the only criticism that can be made upon its style is that it occasionally degenerates into flippancy. Professor Forbes was quite justified in making his joke about the "wink of derision" which *Luidia* gave him as it passed over the side of the boat after breaking off its arm; but it is hardly desirable to waste space in repeating the joke in a text-book. A good many examples of this kind might be quoted.

Mr. Thomson wisely, we think, follows the example of Claus, Boas, and other writers in devoting a considerable amount of space to general matters. The first ninety pages of the book are occupied with an account of the functions of animals, the meaning of organs, tissues, and cells, methods of reproduction, fertilization, segmentation, etc., palæontology, distribution, and the principles of evolution. Evidently these subjects must be treated in the briefest possible way; but the result is on the whole not unsatisfactory. The first chapter, however, which takes for granted a knowledge of the meaning of such words as "cells," for example, would be a pretty tough morsel for the average student beginning zoölogy without any biological training. Of the remaining 514 pages (excluding index), 343 are taken up with invertebrates, and 171 with vertebrates—an arrangement which, for a general text-book, surely gives too much space to the vertebrates.

Publications Received at Editor's Office.

- BRIDGE, JOHN. From Tilbury to Torbay. London, Gilbert & Rivington. 16°. 154 p.
 DE VARNY, HENRY. Experimental Evolution. London and New York, Macmillan & Co. 12°. 283 p. \$1.50.
 HOLM, THEO. Notes on the Flowers of Anthroxanthum Odoratum L. Washington Government. 8°. 5 p.
 MAINE STATE BOARD OF HEALTH. Seventh Annual Report. Augusta, State Printers. 8°. paper. 44 p.
 MUELLER, FERD. VON. Select Extra-Tropical Plants. 8th ed. Melbourne, Australia, Government. 8°. Paper. 603 p.
 RAMSAY, ALEXANDER. The Scientific Roll, Nos. 1, 2, 3, Climate, Baric Condition. London, W. E. Bowers. 8°. Paper.
 SMYTH, BERNARD. B. Check. List of the Plants of Kansas, Topeka. Bernard B. Smyth. 8°. Paper. 34 p.
 TOMPKINS, C. R. The Woodworker's Manual, Dover, N. H. The John A. White Co. 8°. Paper. 60 p. Ill.
 U. S. GEOL. SURVEY. Bulletin No. 79. Washington Government. 8°. paper. 39 p.
 WRIGHT, G. FREDERICK. Man and the Glacial Period. New York, D. Appleton & Co. 12°. 401 p. \$1.75.

Reading Matter Notices.

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For Sale or Exchange.—The subscriber would like to receive cash offers, or an offer in exchange for the earlier volumes of Poggenhoff's Annalen and the later volumes of Silliman's Journal, upon the following list: Chenn—Manuel de Conchyliologie. 2 vols. Nearly 5,000 figures, some hand-colored. Paper. Paris, 1859. Edwards.—Butterflies of N. A. 2 vols. Plates hand-colored. Vol. I, half calf. Vol. II, in parts. Leyman, Agassiz, Hagen.—Ills. Cat. Mus. Comp. Zool. at Harvard. No. I. Ophiuridae. No. II. Acalephae. No. III. Astacidae. All bound in one volume. American Naturalist. Vols. I.-VII. Cloth. Silliman's Am. Jour. of Science and Arts. Third Series. Vols. I.-X. Cloth. Binney.—Terrestrial Mollusks of N. A. Colored plates. 4 vols. Stretch.—Zygæniidae and Bombycidae of N. A. Colored plates. Also a considerable library of monographs, reports, and scientific books, and a large number of duplicates of fossils, minerals and shells. E. A. STRONG, Ypsilanti, Mich., Sept., 1892.

Exchange.—I have the finest shells of Anodonta corpulenta, Cyp'r, and Suborbiculata, Say, in the world. Will exchange for fresh water, land, and marine shells, in large or small quantities. Have also for exchange 50 varieties of fresh water and land shells from Spoon River, Ill. Dr. W. S. STRODE, Lewistown, Ill.

To exchange for books on birds or insects, or for back volumes of American Naturalist: Ecker's "Anatomy of the Frog," Packard's "Guide," Guyot's "The Earth and Man," Rockhill's "The Land of the Lamas," Parker's "Biology," Shoemaker's "Hereditary Health and Personal Beauty," Dexter's "The Kingdoms of Nature," all new. M. J. ELROD, Ill. Wes. Univ., Bloomington, Ill.

For Sale.—About 1087 volumes of the private library of Dr. Nicolas León, formerly director of the Museum at Morelia, embracing publications of special value for Mexicoologists, like those of Bishop Zumárraga (16th century), of Sigüenza y Gongora, of Aleman, etc., the Missal of Spinoza, all very scarce; manuscripts on the history of Michoacán and other Mexican States, on the Tarasco (the Indian language of Michoacán) and several works, of which the only copy known to exist is in this collection. Parties interested in the sale please address DR. NIC. LEÓN, Portal de Matamoros, Morelia, Mexico.

For Exchange.—"The Birds of Kansas,"—Goss, for Gray's Anatomy, or Medical Dictionary. Must be in good condition. Address, J. H. SIMPSON, Buchtel College, Akron, Ohio.

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WANTED.—A position as zoological artist in connection with a scientific expedition, institution or individual investigations. Experienced in microscopic and all scientific work. References given if desired. Address J. HENRY BLAKE, 7 Frentiss Place, N. Cambridge, Mass.

CHEMIST AND ENGINEER, graduate German Polytechnic, Organic and Analytical, desires a position in laboratory or chemical works. Address 213½ E. 7th Street, New York, care Levy.

A MAN, 36 years old, of extensive experience, having the degrees of A.M. and Ph.D., desires a first-class opening as a teacher of Zoölogy and kindred studies in a college or university. Can furnish numerous testimonials or references as to success and skill in most modern laboratory methods. Address E. W. D., Md. Agr. College, College Park, Md.

A JOHNS HOPKINS graduate (1892) desires a position as instructor in mathematics and physics. Address A. B. TURNER, Johns Hopkins University, Baltimore, Md.

A YOUNG MAN, with a thorough training in Analytical Chemistry (including analysis of minerals, food, water, etc.) and holding a diploma of the School of Practical Science, of Toronto, and good testimonials, desires a position as Analytical Chemist or as assistant to such. Address to WM. LAWSON, 16 Washington Ave., Toronto, Ontario.

In treating of each main division of the animal kingdom, the author begins with a classification of the group and general remarks on its biology and characteristics. Then he takes each class in order, and gives an account in some detail of a type-animal, followed by notes on other interesting genera in the class. In the smaller classes, the type may be omitted. Finally the embryology and affinities of the group are discussed. Sometimes the orders also are characterized, especially among the vertebrates, at other times this is unnecessary.

It is impossible to mention fully either the good or bad points of the book in a short review. It is very well up to date in most respects. Résumés are given of important discussions, such as that regarding the origin of the vertebrates, the position of *Balanoglossus* and other Hemichordata, etc. In most cases the treatment of the various subjects discussed is impartial to a degree. We hear something of "anabolism," "katabolism," "maleness," "femaleness," and so forth, but not too much; and the author's opinions are never dogmatically expressed. On the opposite side of the account must be placed the fact that some phylogenetically important groups are very inadequately discussed, apparently because of their small size, the Polyzoa and Brachiopoda, for example. Among the Rotatoria, *Trochosphaera* is apparently not mentioned at all. A feature of questionable advantage is the constantly recurring tables of resemblances and differences between families, orders, classes, and sub-kingdoms. These tables undoubtedly present matters in a striking form, but as undoubtedly they lead to "cram work" in the case of many students. Perhaps this is the reason for their presence. Mr. Thomson says that his book is partly intended for medical students, who, for the M.D. degree in Edinburgh and other British universities, are required to pass an examination in zoölogy. It may be that the tables were inserted with a special view to their requirements. And still another serious defect in the book is the way in which it is mis-illustrated by 32 full-page plates of rough diagrams. None of the illustrations can be called good, some are atrocious.

Still, taking the book all in all, it is perhaps the best lecture-companion for college students in English at present, and it is to be hoped that an American edition may soon be forthcoming.

JOHN GARDINER.

University of Colorado, Boulder, Col.

AMONG THE PUBLISHERS.

To encourage the use of the microscope, which certainly has proved a fascinating hobby for many as well as a most important art for all science-workers, the Bausch & Lomb Optical Company, Rochester, N.Y., has for some time published a hand-book, entitled "Manipulation of the Microscope" (75 cents), by Edward Bausch. That this book has served a good purpose is evidenced by there having been ten thousand copies sold.

— In the announcement of new books and new editions for the holiday season of 1892 the eight-volume set of "The Lives of the Queens of England," by Agnes Strickland, is foremost in J. B. Lippincott Company's list. The work is a reprint of the author's latest revised edition and contains portraits of the queens of England and numerous other illustrations especially prepared for this edition. Dr. Charles C. Abbott, so well known as a most delightful writer upon nature, has a volume of his "Recent Rambles." Most of them were made through the Delaware Valley, the region he has made peculiarly his own, but by way of contrast we also have trips in New Mexico and Arizona, and a wandering through a seaside forest. This is the first one of Dr. Abbott's books to be illustrated, and it contains nineteen reproductions of photographs made by himself. In addition to other important announcements, we note that Mr. W. S. Baker has again laid students of American history under obligations in the "Itinerary of General Washington," which with great pains and accuracy he has compiled from original sources. The work embraces the period of the revolutionary war.

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CALENDAR OF SOCIETIES.

Numismatic and Antiquarian Society,
Philadelphia.

Oct. 6.—The president, Dr. D. G. Brinton, described a recent visit to the aboriginal jasper quarries in the Lehigh Hills, Pennsylvania. Two sites were examined, in company with the discoverer, Mr. H. C. Mercer, and Mr. Charlemagne Tower, president of the Board of Managers of the Museum of the University of Pennsylvania. The pits at one site numbered about sixty; at the other nearly double that number. Some were eighty feet in length by twenty to thirty feet wide and must have been at least twenty to thirty feet deep. An enormous amount of the material had been excavated and carried away to be worked into arrow and spear-heads. Quantities of quarry rejects were visible, and one work-shop site was visited. The discovery of these quarries adds greatly to the correct knowledge of the archaeology of Pennsylvania. Dr. Robert H. Lamborn exhibited and described two copper turtles of singular workmanship, one from the Casas Grandes, the other from Chiriqui, Central America. Both displayed the peculiar character of wire-work in use by the native copper and gold-smiths.

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TO VOLUME XVIII OF
SCIENCE**

is in preparation, and will be issued at an early date.

To the Readers of SCIENCE:

During the past year it has been found possible to enlist the interest of scientific workers in the success of *Science* to such an extent that more than eight hundred have promised contributions during the coming twelve months. Not only are contributions of merit coming in ever increasing numbers from American scientific men and women, but we are now securing our first contributions, in any quantity, from abroad.

We know that this development in the usefulness of *Science* is appreciated, not only from the many kind letters received, which are always inspiring and which we wish our friends would mark as at our disposal for publication, but from a marked increase in the number of new subscribers.

Science owes its existence to the munificence of two gentlemen, whose names we do not feel at liberty to publish, who contributed very nearly \$100,000 toward the support of the paper in its early years. There is no longer need of such liberal subsidizing, but we do need cash subscriptions from all who feel at all interested in a weekly journal of science in America.

There is no question that scientists are cosmopolites and that a journal is the more useful to them the more it is international in its character. As the result of our efforts to develop the use of *Science* abroad, we have recently published articles from V. Ball, Dublin; Edward T. Dixon, Cambridge, England; A. H. Keane, London; David MacRitchie, Edinburgh; Edward Seler, Berlin; Isaac Taylor, York; G. D. Liveing, Cambridge, England; the Marquis de Nardailac, Paris; Miss Agnes Crane, Brighton, England; E. Trouessart, Paris; J. Edmund Clark, York; and have in hand for early publication a number of papers from prominent European scientific men.

To develop this international feature of the paper an enlargement to twice its present size will be necessary, and an increase of the price to six dollars.

If we can secure a sufficient increase in the number of subscribers we can promptly enlarge and improve *Science* still further, but cannot without, as in the past the work, as will be seen, has been largely a labor of love. Within the acquaintance of each of our readers there must be some one sufficiently interested in the development of what we hope is a valuable means of scientific discussion to subscribe six dollars, and we urge each and all our friends to do what they can to help. If the number of new subscribers is as large as we hope, one-half of the enlarged *Science* would be printed and published in London to facilitate promptness of publication.

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